

## Montana Board of Oil and Gas Conservation Environmental Assessment

**Operator:** Brigham Oil & Gas, L.P.  
**Well Name/Number:** Skov 21-16 #1H  
**Location:** NE NE 28 T25N R58E  
**County:** Richland, MT; **Field (or Wildcat)** Wildcat

### Air Quality

(possible concerns)

Long drilling time: No, 30-35 days drilling time.  
Unusually deep drilling (high horsepower rig): Triple derrick rig 1000 HP, 21,056' MD/10,458' TVD Bakken Formation single lateral horizontal well test.  
Possible H<sub>2</sub>S gas production: Slight chance of H<sub>2</sub>S gas production, Mississippian Formations.  
In/near Class I air quality area: No Class I air quality area, in the area of review.  
Air quality permit for flaring/venting (if productive): Yes, DEQ air quality permit required under 75-2-211.

Mitigation:

- ☒ Air quality permit (AQB review)
- ☐ Gas plants/pipelines available for sour gas
- ☐ Special equipment/procedures requirements
- ☐ Other: \_\_\_\_\_

Comments: If there are no existing gas gathering system in this area, associated sweet gas and H<sub>2</sub>S gas can be flared under Board Rule 36.22.1220.

### Water Quality

(possible concerns)

Salt/oil based mud: Yes to intermediate casing string hole, oil based invert drilling fluids. Horizontal lateral will be drilled with brine fluids. Surface casing hole will be drilled with freshwater and freshwater drilling fluid system.

High water table: No high water table anticipated, in the area of review.

Surface drainage leads to live water: No, closest drainages are an Fourmile Creek, about 1/2 of a mile to the west and an unnamed ephemeral tributary to Second Hay Creek, about 3/8 of a mile to the southeast from this location.

Water well contamination: None, closest water wells in the area are about 1/4 of a mile to the northeast, about 3/8 of a mile to the northwest, about 3/8 of a mile to the southeast, about 1/2 of a mile to the northeast, and 3/4 of a mile to the southeast from this location. Depth of these wells range from 43' to 326'. Shallower than the surface casing setting depth of 1800'.

Porous/permeable soils: No, sandy silty clay soils.

Class I stream drainage: No, Class I stream drainages, in the area of review.

Mitigation:

- ☒ Lined reserve pit
- ☒ Adequate surface casing
- ☐ Berms/dykes, re-routed drainage
- ☐ Closed mud system
- ☐ Off-site disposal of solids/liquids (in approved facility)
- ☐ Other: \_\_\_\_\_

Comments: 1800' surface casing well below freshwater zones in adjacent water wells. Also, covering Fox Hills aquifer. Adequate surface casing and BOP equipment to prevent problems in and around freshwater drainage.

### Soils/Vegetation/Land Use

(possible concerns)

Steam crossings: None anticipated.

High erosion potential: No, location will require a moderate cut of up to 14.8' and small fill, up to 4.6', required.

Loss of soil productivity: None, location to be restored after drilling well, if nonproductive. If productive unused portion of wellsite will be reclaimed.

Unusually large wellsite: No, large well site designed as a dual well pad, 500'X500' (Skov 21-16 and Glenn 28-33).

Damage to improvements: Slight, surface use is cultivated land.

Conflict with existing land use/values: Slight

Mitigation

☐ Avoid improvements (topographic tolerance)

☐ Exception location requested

☒ Stockpile topsoil

☐ Stream Crossing Permit (other agency review)

☒ Reclaim unused part of wellsite if productive

☐ Special construction methods to enhance reclamation

☒ Other Requires DEQ General Permit for Storm Water Discharge Associated with Construction Activity, under ARM 17.30.1102(28)

Comments: Will use existing county roads, #347 and #138. About 47' of new access road will be built into this location off existing east-west county road.. Cuttings will be solidified with flyash and buried in the lined reserve pit. Oil base invert drilling fluids will be recycled. Completion fluids will be removed and hauled to commercial Class II Disposal. The pit after solidification will be folded in and covered with subsoil. If well is not productive subsoil will be spread and topsoil will be spread on top of the subsoil. No concerns.

### **Health Hazards/Noise**

(possible concerns)

Proximity to public facilities/residences: Closest residence about 1/4 of a mile to the northeast from this location. Town of Sidney is about 13 miles to the south southeast from this location.

Possibility of H2S: Slight chance H2S, Mississippian Formations.

Size of rig/length of drilling time: Triple drilling rig 30 to 35 days drilling time.

Mitigation:

☒ Proper BOP equipment

☐ Topographic sound barriers

☐ H2S contingency and/or evacuation plan

☐ Special equipment/procedures requirements

☐ Other \_\_\_\_\_

Comments: Adequate surface casing cemented to surface with working BOP stack should mitigate any problems. Sufficient distance between location and buildings noise should not be a problem.

### **Wildlife/recreation**

(possible concerns)

Proximity to sensitive wildlife areas (DFWP identified): None identified.

Proximity to recreation sites: None identified

Creation of new access to wildlife habitat: No

Conflict with game range/refuge management: No

Threatened or endangered Species: Species identified as threatened or endangered are the Pallid Sturgeon, Interior Lease Tern, Whooping Crane and Piping Plover. Candidate species are the Greater Sage Grouse and the Sprague's Pipit. MTFWP Natural Heritage Tracker website indicates one(1) species of concern. That species is the Whooping Crane.

Mitigation:

- ☐ Avoidance (topographic tolerance/exception)
- ☐ Other agency review (DFWP, federal agencies, DSL)
- ☐ Screening/fencing of pits, drillsite
- ☐ Other: \_\_\_\_\_

Comments: Private surface cultivated land. There maybe species of concern that maybe impacted by this wellsite. We ask the operator to consult with the surface owner as to what he would like done, if a species of concern is discovered at this location. The Board of Oil & Gas has no jurisdiction over private surface lands.

### Historical/Cultural/Paleontological

(possible concerns)

Proximity to known sites: None identified.

Mitigation

- ☐ avoidance (topographic tolerance, location exception)
- ☐ other agency review (SHPO, DSL, federal agencies)
- ☐ Other: \_\_\_\_\_

Comments: On private surface cultivated land. There maybe possible historical/cultural/paleontological sites that maybe impacted by this wellsite. We ask the operator to consult with the surface owner as to his desires to preserve these sites or not, if they are found during construction of the wellsite. The Board of Oil & Gas has no jurisdiction over private surface lands.

### Social/Economic

(possible concerns)

- ☐ Substantial effect on tax base
- ☐ Create demand for new governmental services
- ☐ Population increase or relocation

Comments: Wildcat Bakken Formation horizontal well. No concerns.

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### Remarks or Special Concerns for this site

This well is a 21,056'MD/10,458'TVD, Bakken Formation single lateral horizontal well test. Location was constructed to accommodate a second well on the same well location. No concerns.

### Summary: Evaluation of Impacts and Cumulative effects

Short term impacts expected, no long term impacts anticipated.

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I conclude that the approval of the subject Notice of Intent to Drill (does/**does not**) constitute a major action of state government significantly affecting the quality of the human environment, and (does/**does not**) require the preparation of an environmental impact statement.

Prepared by (BOGC): /s/Steven Sasaki

(title:) Chief Field Inspector

Date: February 3, 2012

Other Persons Contacted:

Montana Bureau of Mines and Geology, Groundwater Information Center GWIC  
website

(Name and Agency)

Richland County water wells

(subject discussed)

February 3, 2012

(date)

US Fish and Wildlife, Region 6 website

(Name and Agency)

ENDANGERED, THREATENED, PROPOSED AND CANDIDATE SPECIES MONTANA  
COUNTIES, Richland County

(subject discussed)

February 3, 2012

(date)

Montana Natural Heritage Program Website (FWP)

(Name and Agency)

Heritage State Rank= S1, S2, S3, T25N R58E

(subject discussed)

February 3, 2012

(date)

If location was inspected before permit approval:

Inspection date: \_\_\_\_\_

Inspector: \_\_\_\_\_

Others present during inspection: \_\_\_\_\_